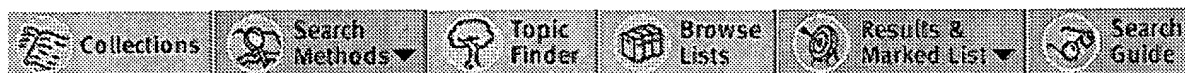


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2	0	((364/401) or (364/402) or (364/464.01) or (364/468) or (364/156) or (364/403) or (364/406) or (364/468) or (364/478) or (364/148) or (364/156)).CCLS.	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/05/06 13:05
3	0	(364/401).CCLS.	USPAT; EPO; JPO; DERWENT; IBM_TDB	2003/05/06 13:05
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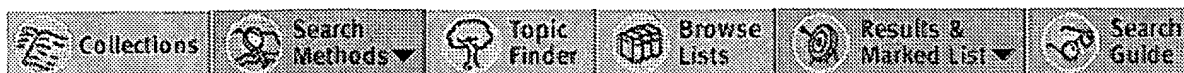
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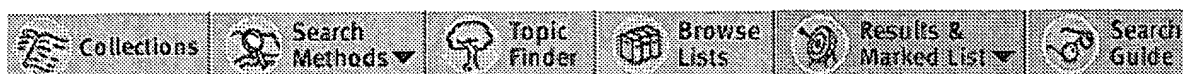
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NAICS:928110

Volume: 34

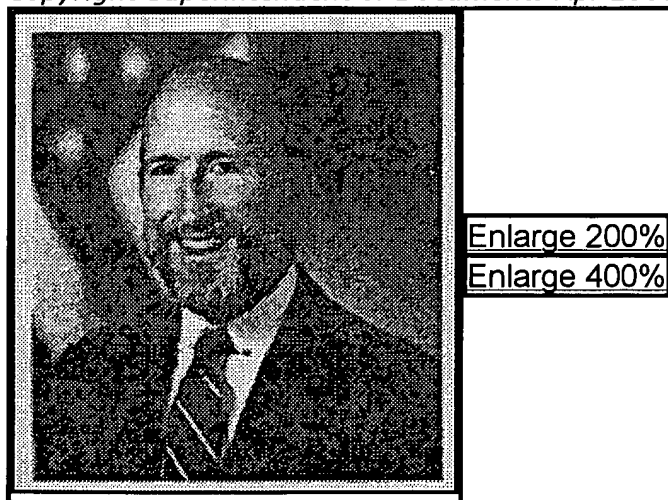
Issue: 2

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ISSN: 00022365

Subject Terms: Government agenciesSeminarsCost analysisDefense spendingCompanies: Department of Defense NAICS:928110**Abstract:**

*The 33rd Annual Department of Defense **Cost Analysis** Symposium was held in Williamsburg VA in Feb 2000. The symposium had three training tracks--an intermediate **cost analysis** track, an advanced **cost analysis** track, and a theme-related track. The theme for 2000 was Force Structure Costing, particularly apt due to the approaching Quadrennial Defense Review.*

Full Text:*Copyright Superintendent of Documents Apr 2000*

The 33rd Annual Department of Defense **Cost Analysis** Symposium (ADODCAS), was held in Williamsburg, Virginia, in early February. This event was a great opportunity for **cost analysis** professionals to develop their technical skills, and discuss issues of general interest to the government financial management community. The symposium had three training tracks; an intermediate **cost analysis** track, an advanced **cost analysis** track, and a theme-related track. This year's theme was Force Structure Costing, particularly apt due to the approaching Quadrennial Defense Review (QDR).

Individuals from across Services attended the theme-related training sessions. A panel discussion led by the

OSD **Cost Analysis** Improvement Group (CAIG) provided an overview of what the DoD infrastructure consists of and issues related to the upcoming QDR. The panel defined infrastructure as the activities that provide support or control of military forces from fixed locations. Though these activities do not directly apply combat power, combat forces can not be equipped, trained, or deployed without them. Due to the limited ability to reduce support infrastructure without affecting forces, the pace of reduction is slowing and aside from further BRAC actions, most of the savings remaining is located in competitive and strategic sourcing. The panel reviewed the status of DoDs ability to estimate infrastructure costs. While models exists for looking at all aspects of infrastructure, there is no single, integrated tool allowing a consistent look.

The tools DoD uses to estimate force costs have tended to take an aggregate, top-down approach. The granularity achievable with these tools is ill suited to the changed military environment: new missions, new types of units, new systems. Unitbased force and infrastructure costing is an approach that seeks to link capabilities to costs at a low level. By tracking cost drivers, we can see how manning assumptions, equipment types, and ops tempo will affect cost. Existing tools are more suited for steady-state peacetime operations. The current operations (i.e., peacekeeping) require accurate methods of contingency costing. Underway is an effort to provide a tool for financial managers to calculate costs above normal day-to-day operations. Experience in Bosnia showed estimating contingency cost errors attributable to 3 main causes: changed missions, errors on cost factors, and activities not considered. The new tool will alleviate the latter two factors.

The Air Force **Cost Analysis** Agency (AFCAA) has been researching ways to better integrate the needs of customers with the tools used and the data available to perform estimates. One of the primary models is SABLE-Systematic Approach to Better Long-range Estimating. This model targets quick-turn squadron level changes to force mix. Other estimating models, such as ACEIT or PRICE target acquisition. Historically-based cost estimating relationships (CERs), Air Force **Cost Analysis** Improvement Group's flying hour factors, and tables in AFI 65-503 are other tools available. However, these tools are limited to analyzing only a portion of Air Force total obligation authority (AF TOA) where a more comprehensive system is required. This is why the Comprehensive Force Structure Cost Model is needed. When finished, this tool expects to provide a life cycle cost model that captures changes to AF TOA (including infrastructure and support costs) with respect to force structure changes.

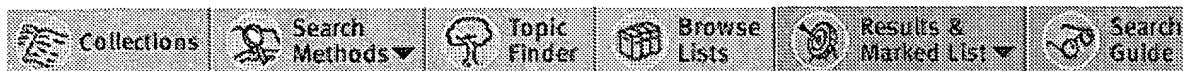
A key aspect of ADODCAS was Service Day. This provided me an opportunity to discuss specific issues of interest to Air Force members. I provided an overview of upward and downward pressures on the Air Force budget. In addition, the AFCAA provided presentations illustrating the difficulties involved in obtaining accurate operations and support (O&S) costs, current earned value management initiatives, development of the force cost model, and the Air Force program projection. Finally, Col Gordon Kage discussed professional development within the financial management career field.

The 33rd ADODCAS was a success, providing training and insight into defense issues, as well as providing an opportunity to associate with individuals from financial management across the DoD. For further information about the symposium, reference the web site at www.ra.pae.osd.mil/adodcas/.

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Manage with facts -- Cost analysis means good decisions

Fleet Equipment; Lincolnwood; Apr 2000; [Bob Deierlein](#);

Volume: 26
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Supplement: Equipment Management: Resource Directory 2000
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[Trucks](#)
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5130: *Maintenance management*
9140: *Statistical data*
9190: *United States*

Geographic Names: [United States](#)
[US](#)

Abstract:

A fleet cannot be managed efficiently and cost-effectively without accurate operating and maintenance cost data on which to base decisions. Benchmarking is becoming more accepted by firms wanting to know if they are on the right track in achieving maximum efficiency. However, right now there is no formal benchmarking with the "best of the best" going on anywhere in the heavy vehicle maintenance function for many reasons. Statistics are presented that should help anyone operating heavy tractor/trailers to compare fleet statistics against some industry database costs and stats.

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[Headnote]

Maintenance costs and frequency of repair statistics can point to needed changes in vehicle specs, maintenance practices and/or technician training.

The truth is that a fleet cannot be managed efficiently and costeffectively without accurate operating and maintenance cost data on which to base decisions. And every day, maintenance decisions affect a vehicle's safe operation.

Benchmarking is becoming more accepted every day by firms wanting to know if they are on the right track in achieving maximum efficiency. However, right now there is no formal benchmarking with the "best of the best" going on anywhere in the heavy vehicle maintenance function for many reasons.

The following statistics, however, should assist anyone operating heavy tractor/trailers to compare his fleet statistics against some industry database costs and stats.

The figures presented here are from a large multi-facility fleet. Its vehicles operate in various vocations, locations and type operations. The dollar figures and costs per mile are probably not as significant as the ratios and trends developing in maintenance needs between systems/components because of the economies of scale enjoyed by this large fleet.

These trends affect component and vehicle spec'ing, inventories, shop equipment and tools, maintenance procedures and mechanic training among other things.

First, some information on the database:

The large number of vehicles in the database means there is significant mix of vehicle ages and average miles in each year covered.

Labor hours are figured at \$21 per hour for each year covered.

Past costs are not adjusted for any increases in parts and outside vendor work.

In all tables, the figures exclude tires and preventive maintenance inspections.

Keep in mind that computerized maintenance statistics generally ask more questions than they answer. Answers only come after digging into the questions, analyzing the figures by region, shop, brand, year and specific operation then conferring with field maintenance personnel etc.

Non-scheduled repairs

Even without being able to dig in and ask questions, the figures in Table 1 can be used to compare with your own figures.

PMT and Non-Scheduled Repairs						
Repair Category	Miles per PM	1996			1999	
		PM Cost per 1000 Miles	PM % of Total Cost	Avg Miles per 1000 Miles	PM Cost per 1000 Miles	PM % of Total Cost
PM Cost per 1000 Miles	2.15	10	15	2,400	10	15
PM % of Total Cost	15	10	15	2,400	10	15
PM Cost per 1000 Miles	2.15	10	15	2,400	10	15
PM % of Total Cost	15	10	15	2,400	10	15

Enlarge 200%

Enlarge 400%

PMT and Non-Scheduled Repairs

The manager who generated these figures has reason to be proud. During 1999, compared to 1996, there are more miles run per PM, a lower PM percent of total cost and an impressive drop in percent of non-scheduled repairs.

It is impossible to plan effectively if the majority of repairs are not scheduled as a result of PM inspections, recall campaigns or predictive maintenance component replacement programs. Service lane reports, driver write-ups, and, of course, road failures are considered non-scheduled and can catch a manager without adequate labor or parts to get the unit back in service quickly. In addition, a high number of non-scheduled repairs will require many pool or extra replacement vehicles.

Table 2 shows average miles per vehicle, maintenance cost per mile and the miles per repair. Along with Table 1, it reveals how well this company's overall maintenance program is working. It also asks some questions.

Even though average miles per truck are up from 1996 and miles per repair are up or even the same, the cost per mile is up substantially in 1999. It could be due to price increases in parts and other services, or as the trucks increased average miles they may have hit some repair plateaus.

System/components reports

The key to the following tables is to compare ranking in cost or frequency of repair against your comparable vehicles' figures. The actual cost per mile is not as important as changes in maintenance needs by component or

It does not necessarily mean that your program is less effective or more effective if you are "way off" on some component or system cost or frequency of repair rankings. It may merely mean you should look at your specs, training and procedures and make sure they are the most cost-effective for your operation.

First, let's review the figures in Table 3 for diesel tractors over 33,000 lbs, GVW.

A sign of the times is that brakes still generate the highest cost per mile component/system even though they are only fourth in frequency of repair rankings. Power plants dropped to seventh in the CPM ranking-a tribute to engine OEMs, the quality of PM inspections or improved maintenance and repair techniques. Lighting has long been number one in repair frequency, but now is moving up in cost as well.

Maintenance Cost and Miles per Repair						
Type Details	1999			1996		
	Cost \$/hr	Cost \$/mi	Miles Repaired	Cost \$/hr	Cost \$/mi	Miles Repaired
Brake Details Tractor 33,000 lbs.	14.00	1.00	1,000	21.00	1.50	1,333
Brake Details Tractor 27,000 lbs.	11.00	0.75	1,467	16.00	1.00	1,600
Brake Details Tractor 21,000 lbs.	9.00	0.60	1,500	13.00	0.80	1,625
Brake Details Tractor 15,000 lbs.	7.00	0.50	1,400	10.00	0.70	1,429
Brake Details Tractor 10,000 lbs.	5.00	0.40	1,250	8.00	0.60	1,333

Enlarge 200%
Enlarge 400%

Maintenance Cost and Miles per Repair

Diesel Tractors Over 33,000 Lbs. GVW						
System Component	1999			1996		
	Cost \$/hr	Cost \$/mi	Frequency % of total	Cost \$/hr	Cost \$/mi	Frequency % of total
Brakes	14.00	1.00	4.0	21.00	1.50	3.0
Power Plant	11.00	0.75	3.0	16.00	1.00	2.0
Lighting	9.00	0.60	1.0	13.00	0.80	1.0
Air System	7.00	0.50	1.0	10.00	0.70	1.0
Power Plant	5.00	0.40	1.0	8.00	0.60	1.0
Clutch	3.00	0.25	1.0	4.00	0.30	1.0
Transmission	2.00	0.20	1.0	3.00	0.25	1.0

Enlarge 200%
Enlarge 400%

Diesel Tractors Over 33,000 Lbs. GVW 1999

Table 4 presents data for diesel tractors under 33,000 lbs. GVW. In this category, lighting systems in 1999 versus 1996 cost more and were repaired more frequently. It's amazing how long this has been a troublesome system, especially with the emphasis put on it by suppliers and fleets. Perhaps, as light emitting diodes are more widely adapted for marker and stop/tail/turn signals, lighting will drop in cost and frequency both.

The cost ranking for air conditioning/heating/ventilation systems is way up to fifth from ninth three years ago as indicated for the trucks in Table 3.

Moving to lighter heavies or mediums, let's review Table 5, which presents data for diesel trucks over 27,000 lbs. GVW.

Again, the braking system is the most costly to maintain probably as a result of safety getting higher and higher on the trucking industry's agenda. Once again, lighting is up in cost, and the power plant is well under 1996's cost ranking. The A/C system costs are up slightly.

Data for the final category, diesel trucks under 27,000 lbs. is shown in Table 6. The greatest change between the data for 1996 and that for 1999 is for clutch costs. This is down substantially in ranking, from four to 10, and down as well in frequency of repairs, from five to 11. Brakes and cab/sheet/metal categories are both at the top as they were in other truck weight categories.

Trailer costs

Although the trailer cost figures in Table 7 cover all types of trailers, the vast majority are dry freight units. Two things stand out. The average age of trailers studied in 1999 has dropped from those in 1996. This, of course, could be the whole reason for the lower costs in each category. However, it could be that spending more dollars on PMs, causing them to be a higher percent of total trailer maintenance cost, did the job.

--	--

Diesel Tractors Under 33,000 Lbs. GVW						
System Component	1999			1998		
	Unit Cost	Change \$/Unit	Repair Rate	Frequency % of cost	Unit Cost	Repair Rate
Brakes	1	0.008	2	7.5	1	9
Lighting	1	0.007	2	7.5	1	7
Wheels	1	0.006	2	7.5	1	6
AT Fluid Filter	1	0.005	2	7.5	1	7
Cooling	1	0.002	2	7.5	1	4
Power Plant	1	0.001	2	7.5	1	3
Fast Fuel	1	0.001	2	7.5	1	2
Chassis	1	0.001	2	7.5	1	2
Supercharger	1	0.001	2	7.5	1	2

Enlarge 200%

Enlarge 400%

Diesel Tractors Under 33,000 lbs. GVW

Diesel Tractors Under 27,000 Lbs. GVW						
System Component	1999			1998		
	Unit Cost	Change \$/Unit	Repair Rate	Frequency % of cost	Unit Cost	Repair Rate
Brakes	1	0.001	2	7.5	1	8
Lighting	1	0.001	2	7.5	1	7
Wheels	1	0.001	2	7.5	1	6
AT Fluid Filter	1	0.001	2	7.5	1	7
Cooling	1	0.001	2	7.5	1	4
Power Plant	1	0.001	2	7.5	1	3
Fast Fuel	1	0.001	2	7.5	1	2
Chassis	1	0.001	2	7.5	1	2
Supercharger	1	0.001	2	7.5	1	2

Enlarge 200%

Enlarge 400%

Diesel Tractors Over 27,000 Lbs. GVW

Diesel Tractors Under 27,000 Lbs. GVW						
System Component	1999			1998		
	Unit Cost	Change \$/Unit	Repair Rate	Frequency % of cost	Unit Cost	Repair Rate
Brakes	1	0.008	2	7.5	1	4
Lighting	1	0.007	2	7.5	1	7
Wheels	1	0.006	2	7.5	1	6
AT Fluid Filter	1	0.005	2	7.5	1	7
Power Plant	1	0.002	2	7.5	1	7
Cooling	1	0.001	2	7.5	1	4
Power Plant	1	0.001	2	7.5	1	3
Fast Fuel	1	0.001	2	7.5	1	2
Chassis	1	0.001	2	7.5	1	2
Supercharger	1	0.001	2	7.5	1	2

Tractor Totals			1999			1998		
System Cost	Unit Cost	Change \$/Unit	Repair Rate	Frequency % of cost	Unit Cost	Repair Rate	Frequency % of cost	Unit Cost
Brakes	1	0.008	2	7.5	1	4	7.5	1
Lighting	1	0.007	2	7.5	1	7	7.5	1
Wheels	1	0.006	2	7.5	1	6	7.5	1
AT Fluid Filter	1	0.005	2	7.5	1	7	7.5	1
Power Plant	1	0.002	2	7.5	1	7	7.5	1
Cooling	1	0.001	2	7.5	1	4	7.5	1
Power Plant	1	0.001	2	7.5	1	3	7.5	1
Fast Fuel	1	0.001	2	7.5	1	2	7.5	1
Chassis	1	0.001	2	7.5	1	2	7.5	1
Supercharger	1	0.001	2	7.5	1	2	7.5	1

Tractors						
System Component	1999			1998		
	Unit Cost	Change \$/Unit	Repair Rate	Frequency % of cost	Unit Cost	Repair Rate
Brakes	1	0.008	2	7.5	1	4
Lighting	1	0.007	2	7.5	1	7
Wheels	1	0.006	2	7.5	1	6
AT Fluid Filter	1	0.005	2	7.5	1	7
Cooling	1	0.002	2	7.5	1	7
Power Plant	1	0.001	2	7.5	1	7
Fast Fuel	1	0.001	2	7.5	1	7
Chassis	1	0.001	2	7.5	1	7
Supercharger	1	0.001	2	7.5	1	7

Enlarge 200%

Enlarge 400%

Diesel Tractors Under 27,000 Lbs. GVW

Let's look at trailer component/systems costs as we did with power units, again considering the trends more than the absolute numbers. Costs for the brakes and lighting systems lead the pack, with wheels/rims/hubs/bearings improving.

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